

ABSTRACT OF THE DISCLOSURE

5 The present invention includes the receptor protein 4-1BB and the cDNA gene
encoding for receptor protein 4-1BB. The nucleotide sequence of the isolated cDNA
is disclosed herein along with the deduced amino acid sequence. The 4-1BB protein
and fragments and derivatives can be used: 1) as a probe to isolate ligands to
receptor protein 4-1BB, 2) to stimulate proliferation of B-cell's expressing 4-1BB, or
10 3) to block 4-1BB ligand binding. A monoclonal antibody against 4-1BB was
developed which specifically recognizes an epitope on the extracellular domain of
receptor protein 4-1BB. The monoclonal antibody can be used enhance T-cell
proliferation and activation by treating T-cells that have expressed receptor protein
4-1BB with the monoclonal antibody. The effectiveness of the treatment was
15 enhanced when conducted in the presence of protein tyrosinase kinase. A fusion
protein for detecting cell membrane ligands to receptor protein 4-1BB was developed.
It comprises the extracellular portion of the receptor protein 4-1BB and a detection
protein bound to the portion of the receptor protein 4-1BB.